

Application No. 10/700,136
Response to Office Action

Customer No. 01933

Listing of Claims:

1. (Currently Amended) A semiconductor device comprising:
a semiconductor substrate having a plurality of connecting pads on one surface;
an insulating film which is formed of a single layer and
5 covers said one surface of the semiconductor substrate, and which includes: (i) a plurality of holes extending through the insulating film, each of the holes corresponding to one of the connecting pads, and (ii) at least one recess extending partially through the insulating film such that a bottom surface of the
10 recess is depressed with respect to an upper surface of the insulating film in a direction of thickness of the insulating film, each said recess extending from a first position at an edge of one of said holes to a second position outside an area above the connecting pad to which said one of the holes corresponds;
15 and
at least one interconnection formed on ~~one of the upper surface of the insulating film~~ and the bottom surface of a corresponding said at least one recess to extend along the bottom surface, each said at least one interconnection being connected
20 to a corresponding one of the connecting pads through a corresponding one of the holes in the insulating film.

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Claim 2 (Canceled).

3. (Currently Amended) A device according to claim 1, wherein each said recess in the insulating film has a pair of side surfaces, and a space is provided between each said at least one interconnection and the side surfaces of the ~~at least one~~ recess in which the interconnection is provided.

4. (Currently Amended) A device according to claim 1, wherein the at least one interconnection comprises a connecting pad portion, and

wherein the semiconductor device further comprises:

5 a bump electrode formed on the connecting pad portion, and

an encapsulating film formed around the bump electrode and on the insulating film and the interconnections at least one interconnection.

5. (Withdrawn) A device according to claim 4, further comprising an upper insulating film formed between the insulating film and the encapsulating film, said upper insulating film having a hole formed in a portion corresponding to each said bump electrode.

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6. (Withdrawn) A device according to claim 5, wherein the insulating film and upper insulating film are made of materials containing a same main component.

7. (Withdrawn) A device according to claim 5, wherein the upper insulating film and the encapsulating film are made of different materials.

8. (Withdrawn) A device according to claim 4, wherein each said bump electrode protrudes from an upper surface of the encapsulating film.

9. (Withdrawn) A device according to claim 4, wherein each said bump electrode comprises a lower bump electrode and an upper bump electrode formed on the lower bump electrode.

10. (Withdrawn) A device according to claim 9, wherein the lower bump electrode protrudes from an upper surface of the encapsulating film.

11. (Withdrawn) A device according to claim 1, wherein the at least one interconnection comprises a connecting pad portion formed on the corresponding one of the connecting pads to which the interconnection is connected, and

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wherein the semiconductor device further comprises:

at least one bump electrode formed on the connecting pad portion of the at least one interconnection, and
an encapsulating film formed around the bump electrode and on the insulating film.

12. (Original) A device according to claim 1, wherein the insulating film is made of an organic resin.

13. (Previously Presented) A device according to claim 1, wherein the recess in the insulating film has a depth which is not less than a thickness of the interconnection.

14. (Original) A device according to claim 1, wherein the insulating film has a thickness of 10 to 30 μ m.

15. (Original) A device according to claim 1, wherein the recess has a depth of 5 to 15 μ m.

16. (Previously Presented) A device according to claim 15, wherein a distance between a bottom surface of the insulating film and the bottom surface of the recess is not less than 1 μ m.

Claims 17-35 (Canceled).

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36. (Currently Amended) A semiconductor device comprising:
a semiconductor substrate having a plurality of connecting
pads on one surface;
an insulating film which covers said one surface of the
5 semiconductor substrate, and which includes: (i) a plurality of
holes extending through the insulating film, each of the holes
corresponding to one of the connecting pads, and (ii) at least
one recess extending partially through the insulating film such
that a bottom surface of the recess is depressed with respect to
10 an upper surface of the insulating film in a direction of
thickness of the insulating film, each said recess extending from
a first position at an edge of one of said holes to a second
position outside an area above the connecting pad to which said
one of the holes corresponds; and
15 at least one interconnection formed on ~~one of the upper~~
~~surface of the insulating film~~ and the bottom surface of a
corresponding said at least one recess to extend along the bottom
surface, each said at least one interconnection being connected
to a corresponding one of the connecting pads through a
20 corresponding one of the holes in the insulating film;
wherein each said recess in the insulating film has a pair
of side surfaces, and a space is provided between each said at
least one interconnection and the side surfaces of the ~~at least~~
~~one recess~~ in which the interconnection is provided.

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37. (Currently Amended) A semiconductor device comprising:
a semiconductor substrate having a plurality of connecting
pads on one surface;
a protective film formed of a single layer, said protective
5 film including: (1) a plurality of holes extending completely
through the protective film, each of the holes corresponding to
one of the connecting pads, and (ii) a plurality of recesses
extending partially through the protective film, ~~such that the~~
~~protective film has a plurality of recessed surfaces in the~~
10 ~~recesses which are each of said recesses having a recessed~~
~~surface that is~~ lower than an upper surface of the protective
film in a thickness direction of the protective film, ~~and each of~~
~~said recesses extending from a first position at an edge of one~~
~~of said holes to a second position outside an area above the~~
15 ~~connecting pad to which said one of the holes corresponds; and~~
interconnections which are respectively connected to the
connecting pads through the holes in the protective film, and
which are provided on ~~one of the upper surface and the recessed~~
~~surfaces of the protective film to extend along the recessed~~
20 ~~surfaces.~~